

Claim Amendment

Claim 14 has been amended by reciting that each cholesteric layer reflects 40 % of incident IR light in the stated wavelength range which is evident from the fact that if only one such layer is used in the coating, it must reflect 40 % of the incident IR radiation. Entry of the amendment is respectfully requested.

The discovery of the present invention is that it is possible to provide a heat insulating medium based on one or more cholesteric layers which is completely transparent to visible radiation and which absorbs very little in both in the near infrared and visible wavelengths. As such, the invention is directed to a heat-insulating coating, which comprises one or more non-micellar cholesteric layers, each reflecting at least 40 % of the incident radiation in the infrared wavelength range above 750 nm.

Prior Art Rejection

Claims 14, 16-21 and 23-27 stand rejected based on 35 USC 102(b) as anticipated by Nippon Sheet Glass. This ground of rejection is respectfully traversed.

Prior to discussing the merits of the reference's disclosure, applicants state that it is well known to one of skill in the art who is familiar with the physical behavior of cholesteric layer material, that it is practically impossible for a specific cholesteric layer to reflect more than 50 % of incident radiation thereon of a specific wavelength. The reason for this is that because a cholesteric layer is composed of liquid crystalline material which forms a helical super structure of specific handedness, only a fraction of the light of a specific wavelength which is incident on a layer, i.e., a fraction with identical handedness, will be reflected by the cholesteric layer. Because normal stay incident visible light consists of radiation of left-handedness and right-handedness, only 50 % of the incident light theoretically can be reflected. On a practical basis,

however, the percentage of reflected light from such layers is significantly below the 50 % value.

Now considering the disclosure of Nippon Sheet Glass in light of the comments above, one of skill in the art considering Fig. 1 of the reference will understand that light of a specific handedness must have been used in the experiments yielding the data of Fig 1, because, for each of the three cholesteric polymer films, a reflectivity of about 75 % was observed, i. e., 83 % minus 8 %(which is the baseline of the spectrum shown). If the same cholesteric layers had been investigated with “normal light” consisting of equal proportions of left-handed and right-handed light, a reflectivity of 37.5 % would have been observed ($75 \% \div 2$). On the other hand, however, the cholesteric layers of the coating of the present invention show significantly improved reflectivity per layer of at least 40 %. This is clear from the last paragraph of Example 1 on page 43 of the present specification which mentions that a cholesteric layer exhibits a reflection of 47 % of incident light. Moreover, by incorporating a $\lambda/2$ film in the heat-insulating coating, reflectivities of about 89 % (about 45 % per layer) can be obtained as described in Example 2 of the text. It is therefore clear that the claimed heat-insulating coating of the present invention is not anticipated by the reference. Moreover, applicants submit that the disclosure of Nippon Glass would not motivate the skilled artisan to improve upon the reflectivity characteristics of the cholesteric films of the reference to achieve the level of effectiveness of the present invention.

Applicants point out that additional evidence of the patentability of the present invention is also found in Fig. 1 of the Nippon Glass reference. Note that the mid-peak width of the reflection peaks of the combination of three cholesteric films can be estimated to be less than 250 nm. This means that the mid-peak width of each film is significantly less than 83 nm because the three films produce peaks of almost identical geometry. In the present invention, however, the cholesteric layers prepared have a significantly wider mid-peak width. As is clear from

Example 3 of the present specification, mid-peak widths of values as high as 121 nm can be achieved. This fact is important from the viewpoint of practicability because the number of cholesteric layers required to reflect a certain wavelength range can be further decreased which simplifies the preparation of heat-insulating coating compositions based on cholesteric polymer films.

In view of the comments above, withdrawal of the rejection is respectfully requested.

Claim 15 stands rejected based on 35 USC 102(b) as anticipated by Nippon Sheet Glass. This ground of rejection is respectfully traversed.

Although the Nippon Sheet Glass reference teaches a transmissivity of at least 75 %, this is done in the context of the actual IR light reflection which is achieved, which, as demonstrated above, is materially less than that achieved in the present invention as set forth in Claim 14. Accordingly, the reference does not anticipate Claim 15 and withdrawal of the rejection is respectfully requested.

Claim 22 stands rejected based on 35 USC 102(b) as anticipated by Nippon Sheet Glass in view of G. B Patent 2,132,623. This ground of rejection is respectfully traversed.

It is clear that the process of the present invention is dependent for its practice to have layers of the cholesteric material of present Claim 14 built into a heat-insulating structure. However, the present invention has been demonstrated to be distinct from the Nippon Glass Sheet reference on the basis of the cholesteric layers which make-up a heat-insulating coating. The British patent does not improve upon the Nippon Glass reference because it does not teach or suggest the characteristics of a heat-insulating coating based on the cholesteric layers described in Claim 14. Accordingly, withdrawal of the rejection is respectfully requested.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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MARKED-UP COPY OF AMENDMENT

IN THE CLAIMS

Please amend Claim 14 as follows:

--14. (Amended) A heat-insulating coating, comprising:

one or more non-micellar cholesteric layers, each [and] reflecting at least 40 % of the
incident radiation in the infrared wavelength range above 750 nm.--